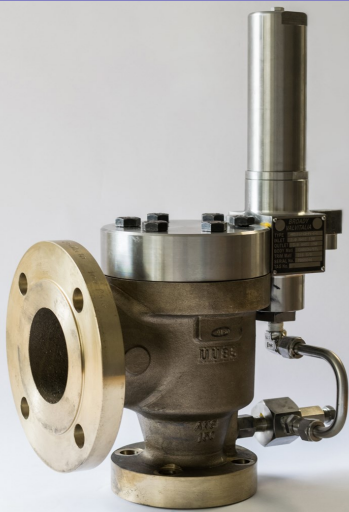




BROADY

F L O W C O N T R O L

Pilot Operated Safety Relief Valves



Engineering complete solutions



BROADY

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The Company



1. Relief. Safety Relief. Pressure Reducing & Sustaining Valves.



2. Valves for Naval Marine and Other Specialist operations.



3. Pattern Makers & Master Founders of Corrosion Resistant Copper Based Alloys.



4. Overhaul & Refurbishment of Broady Valves and Other selected Valve Manufactures Products.

Broady Flow Control Limited is a division within the VALVITALIA Group. We Specialise in the **Innovation** of effective **solutions** to satisfy increasing customer demands, challenges and problems in flow control.

Broady flow Control is an ISO approved Manufacturer of high quality products throughout many different industries. Broady was founded in Hull in 1902 and since this day has expanded to become one of the most well known and respected suppliers of valves in the world. In 2010, the VALVITALIA GROUP acquired Broady Flow Control Limited with the aim of completing its already vast product range.

From that day, Broady has followed a path of continuous growth through its global presence that enables before and after sales services to be delivered locally to clients all over the world. Through financial stability resources to be earmarked every year for research and development activities, in addition to the modernisation of technologies and machinery.

Type 4000

Pilot Operated Safety Relief Valve

The series 4000 Flanged Pilot Operated Safety Relief Valve is a High performance product, designed for superior performance in today's ever expanding industries.

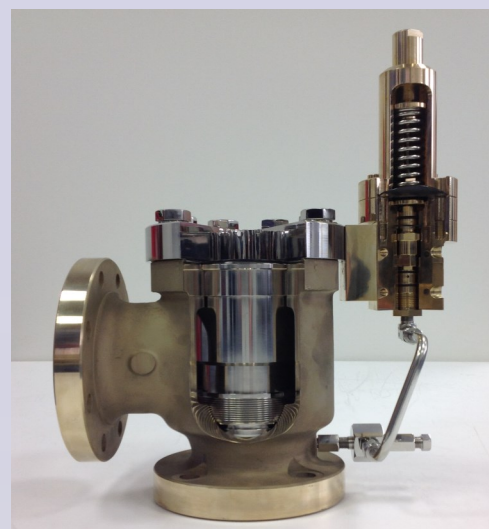
The Type 4000 is a ASME Approved product for both Gas and Liquid. It is available in a range of materials, from stock Carbon Steel and Stainless Steel, to the more specialised materials required to suit the customer's needs.

The soft seat design of the Type 4000 allows for maximum seat tightness with minimum leakage.

Available with a range of different accessories, the Type 4000 can be adapted to suit all different services required. Our R&D department are ever continuing to develop new accessories that aid the user and improve the function.

Type 4000 POSRV Features

- ASME Section VIII, Division 1: "UV" Stamp—Approval.
- Designed, Manufactured and Tested to API 520, 526 and 527.
- CE Marking to Category IV.
- Pop Action or Modulating function.
- Suitable for Gases, Liquids or Vapour Applications.
- Available in Cast Steel as standard or Exotic material upon request.
- API orifice designation from D to T.
- Sizes 1" x 2" through to 8" x 10", Flanged to all recognized standards.
- Excellent Accumulation, Blowdown and repeatable reseating characteristics.



Limits And Standards

Minimum Set Pressure: 2 Barg

Maximum Set Pressure: 425 Barg

Orifice Designation: "D" orifice through to "T" orifice, Full Bore option is also available.

Design standard: ASME Section VII Division 1: 2007 + 2009 Agenda. API 520, 9th edition, July 2014. API 526, Edition 6, April 2009.

Materials of construction:

Carbon Steel, Low Carbon Steel, Stainless Steel, Duplex, Super Duplex, Aluminium Bronze, Gunmetal, Monel, Hastelloy.

Key Features:

Soft seating area for minimal seat tightness with minimal leakage. Adjustable blowdown of between 3-20%. Site test adaptor and back flow preventer fitted as standard.

Pilot can be modified between Pop action and Modulating depending on the customer's requirements, using the same main valve.

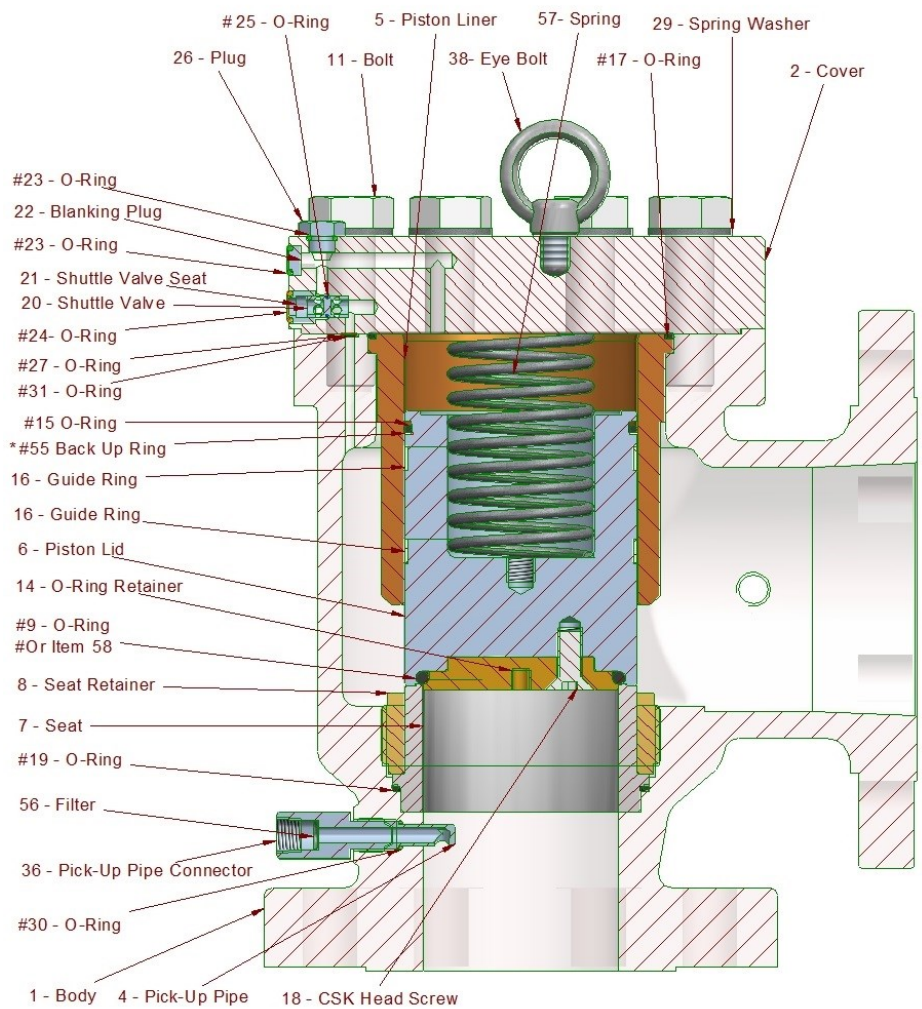


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Series 4000 Pop/Modulating Action POSRV

57	Spring 1 x 2 to 3 x 4 only	1
56	Filter	1
38	Eye Bolt	Various
36	Pick - Up Pipe Connector	1
35	Plug (Modulating Only)	1
32	Pilot Block Spacer (Modulating Only)	1
31	O-Ring	3
30	O-Ring	1
29	Washer Spring	Various
28	Socket Head Capscrew	2
27	O-Ring	1
26	Plug	1
25	O-Ring	1
24	O-Ring	1
23	O-Ring	3
22	Blanking Plug	Various
21	Shuttle Valve Seat	1
20	Shuttle Valve	1
19	O-Ring	1
18	CSK Head Screw	Various
17	O-Ring	1
16	Guide Ring	2
15	O-Ring	1
14	O-Ring Retainer	1
11	Bolt	Various
9	O-Ring	1
8	Seat Retainer	1
7	Seat Retainer	1
6	Piston Lid	1
5	Piston Liner	1
4	Pick-Up Pipe	1
2	Cover	1
1	Body	1
Item	Title	Quantity



1. Set Pressure
2. Back Pressure, Built up and Constant.
3. Medium, with any relevant data, specific gravity or molecular weight ect.
4. Flowrate.
5. Temperature.
6. Material Requirements.
7. Accessories, Test Gag, Manual blowdown ect.
8. Material Certification Requirements.
9. Any special Testing requirements.

How To Order

To Enable Broady flow Control to offer the most suitable valve for your service, please provide the following information at the enquiry stage:



Series 4000 Pop Action Pilot Block

The Type 4000 Pop Action Pilot Valve works by using the operating medium to close the main valve piston lid.

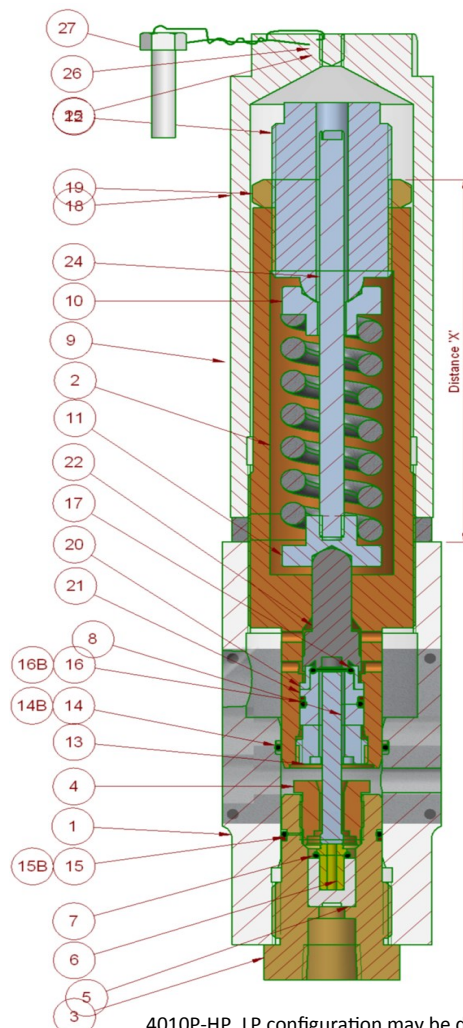
The supply pressure on the inlet side of the pilot valve is fed through a pick up pipe inside the inlet branch of the main valve body, through the pilot block assembly into the main valve piston lid chamber. Due to the area of the piston lid chamber being greater than the seating area on the main valve seat, the piston lid remains closed. When the valve lifts, it opens very rapidly with a pop action, this allows the piston lid chamber to de-pressurise very rapidly to zero, allowing the piston lid to fully open.

Under normal operating conditions the pilot block seat plunger is closed and the lower piston seat open, allowing pressurisation of the piston lid chamber.

As the supply pressure increases and reaches the set point of the pilot block, the top seat plunger in the pilot block rapidly opens with a pop action, quickly depressurising the piston lid chamber allowing the piston the fully open. This in turn allows the valve to fully discharge the medium in the supply pipeline.

At the same time the lower piston in the pilot block closes to prevent re-pressurisation of the piston lid chamber. This allows the piston lid to remain open until the supply pressure has dropped to a level that allows the piston lid chamber to be re-pressurised, closing the piston lid, this is known as the blowdown. This happens when the load of the pilot block spring is greater then the load of the lower piston seat created by the supply pressure.

36	Locking Ring	1
27	M6 x 25 Grub Screw (If Req)	8
26	M6 x 10 Plug	2
25	Joint	1
24	Spindle	1
22	Top Seat Plunger	1
21	Inverted Insert	1
20	Inverted Insert Outer Ring	1
19	Locknut	1
18	Locking Cover	1
17	O-Ring	1
16B	Back Up Ring	1
16	O-Ring	1
15B	Back Up Ring	1
15	O-Ring	1
14B	Back Up Ring	1
14	O-Ring	1
13	Seat Retainer	1
12	Adjusting Screw	1
11	Spring Carrier Lower	1
10	Spring Carrier Upper	1
9	Spring Pilot Valve	1
8	Pin Pilot Valve	1
7	O-Ring	1
6	Upper Seat Insert	1
5	Blowdown Piston (Outer)	1
4	Lower Nozzle Seat	1
3	Inlet Nozzle	1
2	Top Seat Sleeve	1
1	Body	1
Item	Title	Quantity



4010P-HP, LP configuration may be different

Series 4000 Pop Modulating Pilot Block

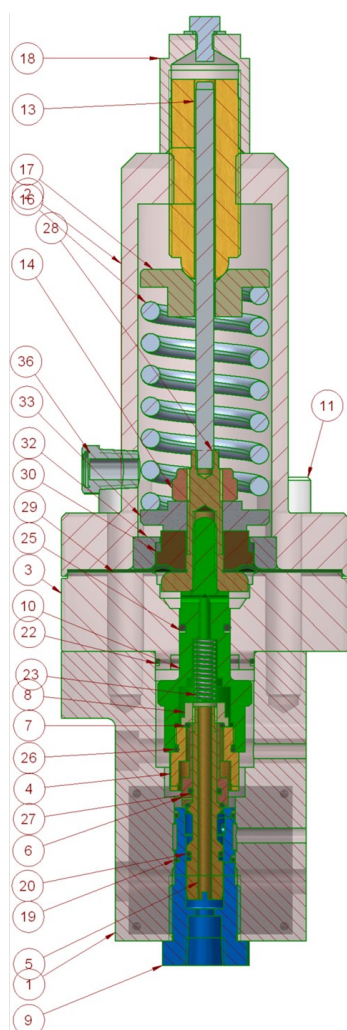
The Type 4000 Pop Action Pilot Valve works by using the operating medium to close the main valve piston lid. The supply pressure on the inlet side of the pilot valve is fed through a pick up pipe inside the inlet branch of the main valve body, through the pilot block assembly into the main valve piston lid chamber. Due to the area of the piston lid chamber being greater than the seating area on the main valve seat, the piston lid remains closed.

When the main piston lid starts to lift it will be proportional to the required flow. As the pressure increases the main piston lid will open further allowing flow to increase up to 110% of the set pressure, where the main piston lid would be fully open allowing maximum flow.

As the supply pressure increases and just before the set point the upper seat closes, this along with the already closed exhaust seat, lock in the pressure in the main valve piston chamber. This allows the main piston lid to open at the set pressure.

Under normal operating conditions, the pilot block upper seat is open and the lower exhaust seat is closed, this allows pressurisation of the main valve piston lid chamber. As the supply pressure increases slightly more, the lower exhaust seat starts to open, allowing the pressure in the main valve piston lid chamber to discharge.

As the main piston lid opens further, the supply pressure will begin to drop, as the supply pressure drops below the set point, the lower exhaust seat begins to close and the upper seat starts to open, pressurising the main piston lid chamber closing the valve.



4020M Configuration Shown, 4010M may be different

40	M6 x 30 Grub Screw (If Req)	1
39	M6 x 10 Plug	1
38	Joint	1
37	Spindle	1
36	Vent Plug	1
33	Spring Carrier Lower	1
32	Diaphragm Sleeve	1
30	Piston	1
29	Bell Diaphragm	1
28	Internal Distance Piece	1
27	O-Ring	1
26	O-Ring	1
25	O-Ring	1
23	Loading Spring Small	1
22	O-Ring	1
20	O-Ring	1
19	O-Ring	2
18	Locking Cover	1
17	Spring Carrier Upper	1
16	Spring Main Pilot	1
14	Nut	1
13	Adjusting Screw	1
10	Feed Back Piston	1
9	Hex Sleeve	1
8	Spool Upper Seat Collar	1
7	O-Ring	2
6	Spool Sleeve	1
5	Inner Spool	1
4	Inlet Seat	1
3	Distance Piece	1
2	Cover	1
1	Body	1
Item	Title	Quantity



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F L O W C O N T R O L

Weights & Dimensions (Pop Action)

Type	Inlet x Outlet		Weight	Weight	Inlet	Outlet	A	B	C
	Metric	Imperial	Approx Kg	Approx Kg	Rate	Rate			
			Carb/Stain	Al Bronze	R/F	R/F	mm	mm	mm
40111 D, E & F	25 x 50	1 x 2	15.5	17.1	150	150	114.3	105	384
40131 D, E & F	25 x 50	1 x 2	16.4	18	300	150	114.3	111.2	390
40151 D, E & F	25 x 50	1 x 2	16.1	17.5	600	150	114.3	111.2	390
40162 D, E & F	25 x 50	1 x 2	27	29.7	900	300	120.7	125.5	418
40172 D, E & F	25 x 50	1 x 2	27	29.7	1500	300	120.7	125.5	418
40182 D, E & F	25 x 50	1 x 2	28	30.8	2500	300	120.7	125.5	418
401½11 D, E & F	40 x 50	1.5 x 2	22	24.2	150	150	121	124	424
401½31 D, E & F	40 x 50	1.5 x 2	23.5	25.9	300	150	121	124	424
401½51 D, E & F	40 x 50	1.5 x 2	23	25.3	600	150	121	124	424
401½62 D, E & F	40 x 50	1.5 x 2	38	41.8	900	300	140	149	450
401½72 D, E & F	40 x 50	1.5 x 2	38	41.8	1500	300	140	149	450
401½82 D, E & F	40 x 50	1.5 x 2	45	49.5	2500	300	140	149	450
40211 G & H	40 x 80	1.5 x 3	23.5	25.9	150	150	123.7	130	418
40231 G & H	40 x 80	1.5 x 3	25.5	28.1	300	150	123.7	130	418
40251 G & H	40 x 80	1.5 x 3	25	27.5	600	150	123.7	130	418
40262 G & H	40 x 80	1.5 x 3	43	47.3	900	300	171.5	162	454
40272 G & H	40 x 80	1.5 x 3	43	47.3	1500	300	171.5	162	454
40282 G & H	40 x 80	1.5 x 3	49	53.9	2500	300	171.5	162	454
40311 G, H & J	50 x 80	2 x 3	30	33	150	150	123.7	136.4	433
40331 G, H & J	50 x 80	2 x 3	30.5	33.6	300	150	123.7	136.4	433
40351 G, H & J	50 x 80	2 x 3	30	33	600	150	123.7	136.4	433
40362 G, H & J	50 x 80	2 x 3	50	55	900	300	171.5	166.6	466
40372 G, H & J	50 x 80	2 x 3	50	55	1500	300	171.5	166.6	466
40382 G, H & J	50 x 80	2 x 3	67	73.7	2500	300	171.5	177.8	486
40411J, K & L	80 x 100	3 x 4	53	58.3	150	150	162	156	489
40431J, K & L	80 x 100	3 x 4	54	60	300	150	162	156	490
40451J, K & L	80 x 100	3 x 4	54	59.4	600	150	162	162	496
40462J, K & L	80 x 100	3 x 4	84	92.4	900	300	180	190.5	514
40472J, K & L	80 x 100	3 x 4	87	95.7	1500	300	180	190.5	514
50411L, M, N & P	100 x 150	4 x 6	80.5	88.6	150	150	209.5	196.8	563
50431L, M, N & P	100 x 150	4 x 6	83.5	91.9	300	150	209.5	196.8	563
50451L, M, N & P	100 x 150	4 x 6	85	93.5	600	150	209.5	196.8	563
50462L, M, N & P	100 x 150	4 x 6	147	161.7	900	300	233.4	250	620
50472L, M, N & P	100 x 150	4 x 6	150	165	1500	300	233.4	247.3	620
40611 Q & R	150 x 200	6 x 8	183.5	201.9	150	150	241.3	239.7	645
40631 Q & R	150 x 200	6 x 8	189	207.9	300	150	241.3	239.7	645
40651 Q & R	150 x 200	6 x 8	204	224.4	600	150	241.3	246.5	654
40652 Q & R	150 x 200	6 x 8	210	231	900	300	265	246.5	654
40711 T	200 x 250	8 x 10	311	342.1	150	150	279.4	276.3	729
40731 T	200 x 250	8 x 10	319	350.9	300	150	279.4	276.3	729
40751 T	200 x 250	8 x 10	345	379.5	600	150	279.4	297	729

A — Centre of Inlet to outlet face

B — Centre of outlet to inlet face

C — Height



Weights & Dimensions (Modulating Action)

Type	Inlet x Outlet		Weight	Weight	Inlet Rate	Outlet Rate	A	B	C
	Metric	Imperial	Approx Kg Carb/Stain	Approx Kg Al Bronze					
40111 D, E & F	25 x 50	1 x 2	20.5	22.6	150	150	114.3	105	416
40131 D, E & F	25 x 50	1 x 2	21.4	23.5	300	150	114.3	111.2	419
40151 D, E & F	25 x 50	1 x 2	21.1	23.2	600	150	114.3	111.2	419
40162 D, E & F	25 x 50	1 x 2	43	47.3	900	300	120.7	125.5	559
40172 D, E & F	25 x 50	1 x 2	43	47.3	1500	300	120.7	125.5	559
40182 D, E & F	25 x 50	1 x 2	44	48.4	2500	300	120.7	125.5	559
401½11 D, E & F	40 x 50	1.5 x 2	27	29.7	150	150	121	124	453
401¾31 D, E & F	40 x 50	1.5 x 2	28.5	31.4	300	150	121	124	453
401½51 D, E & F	40 x 50	1.5 x 2	28	30.8	600	150	121	124	471
401¾62 D, E & F	40 x 50	1.5 x 2	54	59.4	900	300	140	149	591
401¾72 D, E & F	40 x 50	1.5 x 2	54	59.4	1500	300	140	149	591
401¾82 D, E & F	40 x 50	1.5 x 2	60.5	66.6	2500	300	140	149	591
40211 G & H	40 x 80	1.5 x 3	28.5	31.4	150	150	123.7	130	448
40231 G & H	40 x 80	1.5 x 3	30.5	33.6	300	150	123.7	130	448
40251 G & H	40 x 80	1.5 x 3	30	33	600	150	123.7	130	465
40262 G & H	40 x 80	1.5 x 3	59	64.9	900	300	171.5	162	595
40272 G & H	40 x 80	1.5 x 3	59	64.9	1500	300	171.5	162	595
40282 G & H	40 x 80	1.5 x 3	65	71.5	2500	300	171.5	162	595
40311 G, H & J	50 x 80	2 x 3	35	38.5	150	150	123.7	136.4	462
40331 G, H & J	50 x 80	2 x 3	35.5	39.1	300	150	123.7	136.4	462
40351 G, H & J	50 x 80	2 x 3	35	38.5	600	150	123.7	136.4	480
40362 G, H & J	50 x 80	2 x 3	66	72.6	900	300	171.5	166.6	608
40372 G, H & J	50 x 80	2 x 3	66	72.6	1500	300	171.5	166.6	608
40382 G, H & J	50 x 80	2 x 3	83	91.3	2500	300	171.5	177.8	627
40411J, K & L	80 x 100	3 x 4	58	63.8	150	150	162	156	518
40431J, K & L	80 x 100	3 x 4	59.9	65.5	300	150	162	156	519
40451J, K & L	80 x 100	3 x 4	59	64.9	600	150	162	162	525
40462J, K & L	80 x 100	3 x 4	100	110	900	300	180	190.5	655
40472J, K & L	80 x 100	3 x 4	103	113.3	1500	300	180	190.5	655
50411L, M, N & P	100 x 150	4 x 6	85.5	94.1	150	150	209.5	196.8	592
50431L, M, N & P	100 x 150	4 x 6	88.5	97.4	300	150	209.5	196.8	592
50451L, M, N & P	100 x 150	4 x 6	90	99	600	150	209.5	196.8	610
50462L, M, N & P	100 x 150	4 x 6	163	179.3	900	300	233.4	250	761
50472L, M, N & P	100 x 150	4 x 6	166	182.6	1500	300	233.4	247.3	761
40611 Q & R	150 x 200	6 x 8	188.5	207.4	150	150	241.3	239.7	674
40631 Q & R	150 x 200	6 x 8	194	213.4	300	150	241.3	239.7	674
40651 Q & R	150 x 200	6 x 8	209	229.98	600	150	241.3	246.5	701
40652 Q & R	150 x 200	6 x 8	215	236.5	900	300	265	246.5	701
40711 T	200 x 250	8 x 10	316	347.6	150	150	279.4	276.3	758
40731 T	200 x 250	8 x 10	324	356.4	300	150	279.4	276.3	758
40751 T	200 x 250	8 x 10	350	385	600	150	279.4	297	795

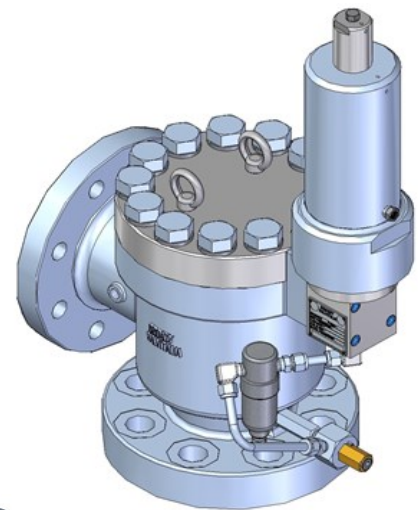
A — Centre of Inlet to outlet face B — Centre of outlet to inlet face C — Height



Accessories & Options

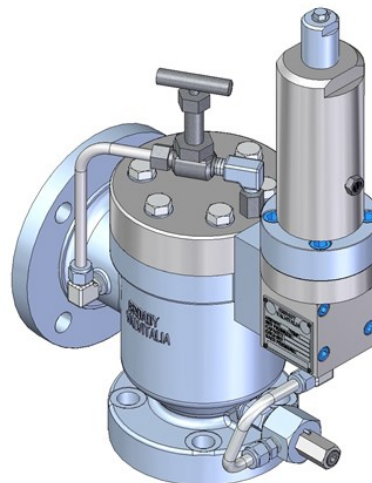
Inline Filter

An Inline Filter should be used for any valve considered to be used on dirty service. The pilot block is a high integrity precise design that can become easily clogged and blocked if the service is dirty. The inline filter ensures the Pilot block remains free from such contamination and functions correctly.



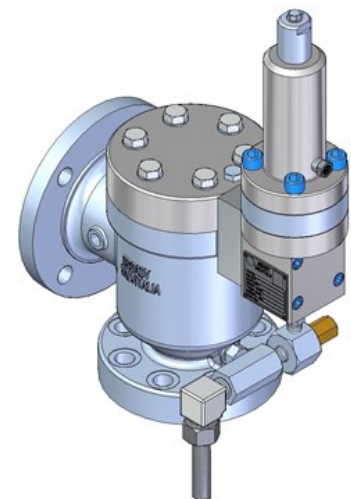
Manual Blowdown

This Valve allows opening of the valve without actuation of the pilot valve. Opening of the blowdown valve rapidly depressurises the main valve piston lid chamber, allowing the lid to lift and the valve to discharge.

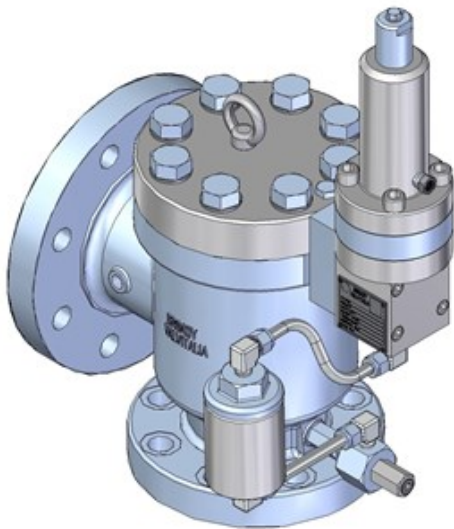


Remote Sensing

When inlet pressure losses are greater than 3%, remote sensing is required. Connection to the system that is to be protected should be where the pressure is stable. The flow should be minimal so that the sensing is not effected when the main valve is discharging.

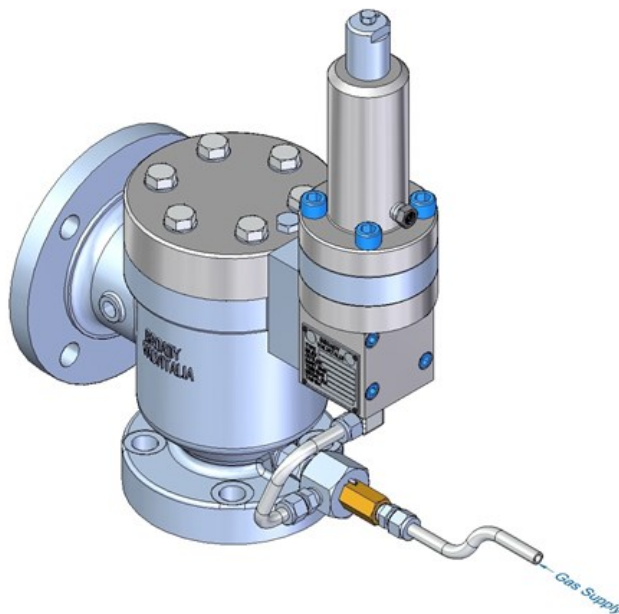


Accessories & Options



Surge Snubber

This feature provides extra volume and scatters the fluid path to help ensure a constant pressure supply to the pilot for service that involves pulsations or pressure spikes. Uncontrolled pulsations from a positive displacement compressor or similar equipment may have the effect of opening the pilot prematurely, below set pressure.



Field Test Connector

The Field Test Connector allows the user to verify set pressure while in service without removing the valve. An external pressure source is attached to the Field Test Connector to introduce pressure to the pilot. As the pilot discharges the main valve will open. The benefit of the FTC is the valve can be full check for functionality without having to over pressure the inlet.

Other Accessories are available.
Please contact the Broady sales
team for further information.



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Broady Quality

Broady Flow Control Limited, over its many years of trading, has developed into a highly efficient and customer focused organisation, well placed to satisfy the ever changing requirements of the industry. Renowned for innovation, flexibility and integrity. Broady has a well established and robust quality management system which supports order processing and manufacturing, ensuring the highest standards are maintained at all times.

The Dedicated Management team is supported by a highly skilled and dedicated workforce trained in all engineering disciplines. The future of Broady is assured by the policy of employment and training of young dynamic apprentices who are fully involved in the development and implementation of the quality management system.

At the Heart of Broadys philosophy is the desire to strive for continual improvement and complete customer satisfaction through the process of internal and external audits designed to ensure a "right first time" environment.

Broady Flow Control Limited is committed to maintaining and continually Improving the quality of the products and services offered to all its customers

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Valves from the Broady Product Range



3500 Series Pressure Safety Valves



Fire Fighting — Hydrant Reducing Valves



Small Safety Valves 2600, 180 & 180S



Small Safety ASME Coded Safety valve 3600



Reducing Valves - A, AB, C, D, B2



Sustaining Valves - Type A, Type D, Type 8, Type 9

Please Contact The
Broady Flow Control Sales
department for more
information on our
extensive product range.

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Engineering complete solutions

The information, specifications and technical data contained in this guide are subject to change without notice. The user should verify all technical data and specifications prior to use.

Broady Flow control does not warrant that the material and information contained herein is current and assumed no responsibility for the use or misuse of any such material and information by the user.

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